SPEC CPU®2017 Integer Speed Result

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Hewlett Packard Enterprise
(Test Sponsor: HPE)
ProLiant DL325 Gen10 Plus
(2.35 GHz, AMD EPYC 7452)

CPU2017 License: 3
Test Sponsor: HPE
Tested by: HPE

Hewlett Packard Enterprise
Hewlett Packard Enterprise

SPECspeed®2017_int_base = 8.64
SPECspeed®2017_int_peak = 8.90

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SPECspeed®2017_int_peak = 8.90

Hardware

CPU Name: AMD EPYC 7452
Max MHz: 3350
Nominal: 2350
Enabled: 32 cores, 1 chip
Orderable: 1 chip
Cache L1: 32 KB I + 32 KB D on chip per core
L2: 512 KB I+D on chip per core
L3: 128 MB I+D on chip per chip, 16 MB shared / 4 cores
Other: None
Memory: 512 GB (8 x 64 GB 2Rx4 PC4-3200AA-R)
Storage: 1 x 480 GB SATA SSD, RAID 0
Other: None

Software

OS: SUSE Linux Enterprise Server 15 (x86_64) SP1
Kernel 4.12.14-195-default
Compiler: C/C++/Fortran: Version 2.0.0 of AOCC
Parallel: Yes
Firmware: HPE BIOS Version A43 12/12/2019 released Dec-2019
File System: xfs
System State: Run level 3 (multi-user)
Base Pointers: 64-bit
Peak Pointers: 32/64-bit
Other: jemalloc: jemalloc memory allocator library v5.1.0
Power Management: BIOS set to prefer performance at the cost of additional power usage
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Results Table

<table>
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<th>Benchmark</th>
<th>Threads</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
<th>Seconds</th>
<th>Ratio</th>
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<td>600.perlbench_s</td>
<td>32</td>
<td>379</td>
<td>4.68</td>
<td>381</td>
<td>4.66</td>
<td>376</td>
<td>4.72</td>
<td>1</td>
<td>352</td>
<td>5.04</td>
<td>358</td>
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<tr>
<td>605.mcf_s</td>
<td>32</td>
<td>323</td>
<td>14.6</td>
<td>320</td>
<td>14.7</td>
<td>322</td>
<td>14.7</td>
<td>1</td>
<td>301</td>
<td>15.7</td>
<td>302</td>
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<tr>
<td>620.omnetpp_s</td>
<td>32</td>
<td>327</td>
<td>4.99</td>
<td>332</td>
<td>4.92</td>
<td>325</td>
<td>5.01</td>
<td>1</td>
<td>323</td>
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<td>323</td>
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<tr>
<td>625.x264_s</td>
<td>32</td>
<td>141</td>
<td>12.5</td>
<td>143</td>
<td>12.4</td>
<td>142</td>
<td>12.4</td>
<td>1</td>
<td>138</td>
<td>12.7</td>
<td>139</td>
</tr>
<tr>
<td>631.deepsjeng_s</td>
<td>32</td>
<td>297</td>
<td>4.82</td>
<td>296</td>
<td>4.84</td>
<td>299</td>
<td>4.79</td>
<td>1</td>
<td>289</td>
<td>4.95</td>
<td>289</td>
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<tr>
<td>641.leela_s</td>
<td>32</td>
<td>412</td>
<td>4.14</td>
<td>417</td>
<td>4.10</td>
<td>420</td>
<td>4.06</td>
<td>32</td>
<td>412</td>
<td>4.14</td>
<td>417</td>
</tr>
<tr>
<td>648.exchange2_s</td>
<td>32</td>
<td>182</td>
<td>16.2</td>
<td>181</td>
<td>16.3</td>
<td>182</td>
<td>16.1</td>
<td>1</td>
<td>181</td>
<td>16.3</td>
<td>181</td>
</tr>
<tr>
<td>657.xz_s</td>
<td>32</td>
<td>311</td>
<td>19.8</td>
<td>311</td>
<td>19.8</td>
<td>312</td>
<td>19.8</td>
<td>32</td>
<td>311</td>
<td>19.8</td>
<td>311</td>
</tr>
</tbody>
</table>

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Compiler Notes

The AMD64 AOCC Compiler Suite is available at http://developer.amd.com/amd-aocc/

Submit Notes

The config file option 'submit' was used. 'numactl' was used to bind copies to the cores.
See the configuration file for details.

Operating System Notes

'ulimit -s unlimited' was used to set environment stack size
'ulimit -l 2097152' was used to set environment locked pages in memory limit

runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Set dirty_ratio=8 to limit dirty cache to 8% of memory
Set swappiness=1 to swap only if necessary
Set zone_reclaim_mode=1 to free local node memory and avoid remote memory sync then drop_caches=3 to reset caches before invoking runcpu

dirty_ratio, swappiness, zone_reclaim_mode and drop_caches were all set using privileged echo (e.g. echo 1 > /proc/sys/vm/swappiness).

Transparent huge pages set to 'always' for this run (OS default)
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### Hewlett Packard Enterprise

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<table>
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<th>CPU2017 License</th>
<th>Test Date</th>
<th>Test Sponsor</th>
<th>Hardware Availability</th>
<th>Tested by</th>
<th>Software Availability</th>
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</thead>
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<tr>
<td>3</td>
<td>Feb-2020</td>
<td>HPE</td>
<td>Dec-2019</td>
<td>HPE</td>
<td>Aug-2019</td>
</tr>
</tbody>
</table>

### SPECspeed®2017_int_base = 8.64

### SPECspeed®2017_int_peak = 8.90

## Environment Variables Notes

Environment variables set by runcpu before the start of the run:

- `GOMP_CPU_AFFINITY = "0-31"
- `LD_LIBRARY_PATH = 
  
- "/home/cpu2017/amd_speed_aocc200_rome_C_lib/64;/home/cpu2017/amd_speed_a
  
- occ200_rome_C_lib/32:" 
- `MALLOC_CONF = "retain:true"
- `OMP_DYNAMIC = "false"
- `OMP_SCHEDULE = "static"
- `OMP_STACKSIZE = "128M"
- `OMP_THREAD_LIMIT = "32"

Environment variables set by runcpu during the 600.perlbench_s peak run:

- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 602.gcc_s peak run:

- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 605.mcf_s peak run:

- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 620.omnetpp_s peak run:

- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 623.xalancbmk_s peak run:

- `GOMP_CPU_AFFINITY = "0"
  
- `OMP_STACKSIZE = "128M"

Environment variables set by runcpu during the 625.x264_s peak run:

- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 631.deepsjeng_s peak run:

- `GOMP_CPU_AFFINITY = "0"

Environment variables set by runcpu during the 648.exchange2_s peak run:

- `GOMP_CPU_AFFINITY = "0"

## General Notes

Binaries were compiled on a system with 2x AMD EPYC 7601 CPU + 512GB Memory using Fedora 26

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2)
General Notes (Continued)

is mitigated in the system as tested and documented.

jemalloc: configured and built with GCC v9.1.0 in Ubuntu 19.04 with -O3 -znver2 -flto
jemalloc 5.1.0 is available here:
https://github.com/jemalloc/jemalloc/releases/download/5.1.0/jemalloc-5.1.0.tar.bz2

Platform Notes

BIOS Configuration
Thermal Configuration set to Maximum Cooling
SMT Mode set to Disabled
Determinism Control set to Manual
Performance Determinism set to Power Deterministic
Minimum Processor Idle Power Core C-State set to C6 State
Memory Patrol Scrubbing set to Disabled
Workload Profile set to General Peak Frequency Compute
NUMA memory domains per socket set to Four memory domains per socket
C-State Efficiency mode set to Disabled

Sysinfo program /home/cpu2017/bin/sysinfo
Rev: r6365 of 2019-08-21 295195f888a3d7ed8be6e46a485a0011
running on linux-q10k Thu Feb 14 09:23:45 2019

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : AMD EPYC 7452 32-Core Processor
  1 "physical id"s (chips)
    32 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 32
siblings : 32
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

From lscpu:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
Address sizes: 48 bits physical, 48 bits virtual
CPU(s): 32

(Continued on next page)
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Platform Notes (Continued)

On-line CPU(s) list: 0-31
Thread(s) per core: 1
Core(s) per socket: 32
Socket(s): 1
NUMA node(s): 4
Vendor ID: AuthenticAMD
CPU family: 23
Model: 49
Model name: AMD EPYC 7452 32-Core Processor
Stepping: 0
CPU MHz: 2345.661
BogoMIPS: 4691.32
Virtualization: AMD-V
L1d cache: 32K
L1i cache: 32K
L2 cache: 512K
L3 cache: 16384K
NUMA node0 CPU(s): 0-7
NUMA node1 CPU(s): 8-15
NUMA node2 CPU(s): 16-23
NUMA node3 CPU(s): 24-31
Flags: fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca cmov pat pse36 clflush mmx fxsr sse sse2 ht syscall nx mmxext fxsr_opt pdpe1gb rdtscp lm constant_tsc rep_good xtopology nonstop_tsc cpuid extd_apicid aperfmperf pni pclmulqdq monitor ssse3 fma cx16 sse4_1 sse4_2 movbe popcnt aes xsave avx f16c rdrand lahf_lm cmp_legacy svm extapic cr8_legacy abm sse4a misalignsse 3dnowprefetch osvw ibr skinit wdt tce topexit perfctr_core perfctr_nb perfctr_l2 mwaitx cpb cat_l3 cdp_l3 hw_pstate ssbd ibrs ibpb stibp vmmcall fsbgbase bni1 avx2 smep bmi2 cqm rdt_a rdseed adx smap clflushopt clwb sha ni xsaveopt xsaves xsave xsavec xgetbv1 xsaveopt cqm_llc cqm_occup_llc cqm_mbb_total cqm_mbb_local czero lperf xsaverptr arat npt lbrv svm_lock nrip_save tsc_scale vmcb_clean flushbyasin decodeassist psfaith pfthreshold avic v_vmsave_vmload vgif umip rdpid overflow_recover succor smca

From numactl --hardware WARNING: a numactl 'node' might or might not correspond to a physical chip.
available: 4 nodes (0-3)
node 0 cpus: 0 1 2 3 4 5 6 7
node 0 size: 128712 MB
node 0 free: 128397 MB
node 1 cpus: 8 9 10 11 12 13 14 15
node 1 size: 128992 MB
node 1 free: 128841 MB
node 2 cpus: 16 17 18 19 20 21 22 23
node 2 size: 129021 MB

(Continued on next page)
Platform Notes (Continued)

node 2 free: 128866 MB
node 3 cpus: 24 25 26 27 28 29 30 31
node 3 size: 129009 MB
node 3 free: 128845 MB
node distances:
node 0 1 2 3
  0: 10 12 12 12
  1: 12 10 12 12
  2: 12 12 10 12
  3: 12 12 12 10

From /proc/meminfo
   MemTotal:      528114120 kB
   HugePages_Total:       0
   Hugepagesize:       2048 kB

From /etc/*release* /etc/*version*
   os-release:
      NAME="SLES"
      VERSION="15-SP1"
      VERSION_ID="15.1"
      PRETTY_NAME="SUSE Linux Enterprise Server 15 SP1"
      ID="sles"
      ID_LIKE="suse"
      ANSI_COLOR="0;32"
      CPE_NAME="cpe:/o:suse:sles:15:sp1"

   uname -a:
      Linux linux-q10k 4.12.14-195-default #1 SMP Tue May 7 10:55:11 UTC 2019 (8fba516)
x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:

 CVE-2018-3620 (L1 Terminal Fault): Not affected
 MICROARCHITECTURAL DATA SAMPLING: Not affected
 CVE-2017-5754 (Meltdown): Not affected
 CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store Bypass disabled
    via prctl and seccomp
 CVE-2017-5753 (Spectre variant 1): Mitigation: __user pointer sanitization
 CVE-2017-5715 (Spectre variant 2): Mitigation: Full AMD retpoline, IBPB:
    conditional, IBRS_FW, STIBP: disabled, RSB

 run-level 3 Feb 14 09:23

 SPEC is set to: /home/cpu2017
 Filesystem Type Size Used Avail Use% Mounted on

(Continued on next page)
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Platform Notes (Continued)
/dev/sda3 xfs 155G 9.3G 146G 6% /home

From /sys/devices/virtual/dmi/id
BIOS: HPE A43 12/12/2019
Vendor: HPE
Product: ProLiant DL325 Gen10 Plus
Product Family: ProLiant
Serial: CN792906TF

Additional information from dmidecode follows. WARNING: Use caution when you interpret
this section. The 'dmidecode' program reads system data which is "intended to allow
hardware to be accurately determined", but the intent may not be met, as there are
frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.
Memory:
8x Micron 36ASF8G72PZ-3G2B2 64 GB 2 rank 3200
8x UNKNOWN NOT AVAILABLE

Compiler Version Notes

==============================================================================
C       | 600.perlbench_s(base, peak) 602.gcc_s(base, peak) 605.mcf_s(base, peak) 625.x264_s(base, peak) 657.xz_s(base, peak)
-----------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: x86_64-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----------------------------------------------------------------------------

==============================================================================
C++     | 623.xalancbmk_s(peak)
-----------------------------------------------------------------------------
AOCC.LLVM.2.0.0.B191.2019_07_19 clang version 8.0.0 (CLANG: Jenkins
AOCC_2_0_0-Build#191) (based on LLVM AOCC.LLVM.2.0.0.B191.2019_07_19)
Target: i386-unknown-linux-gnu
Thread model: posix
InstalledDir: /sppo/dev/compilers/aocc-compiler-2.0.0/bin
-----------------------------------------------------------------------------

==============================================================================
C++     | 620.omnetpp_s(base, peak) 623.xalancbmk_s(base)
       | 631.deepsjeng_s(base, peak) 641.leela_s(base, peak)
-----------------------------------------------------------------------------

(Continued on next page)
Base Compiler Invocation

C benchmarks:
clang

C++ benchmarks:
clang++
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</table>

Base Compiler Invocation (Continued)

Fortran benchmarks:
flang

**Base Portability Flags**

600.perlbench_s: -DSPEC_LINUX_X64 -DSPEC_LP64  
602.gcc_s: -DSPEC_LP64  
605.mcf_s: -DSPEC_LP64  
620.omnetpp_s: -DSPEC_LP64  
623.xalancbmk_s: -DSPEC_LINUX -DSPEC_LP64  
625.x264_s: -DSPEC_LP64  
631.deepsjeng_s: -DSPEC_LP64  
641.leela_s: -DSPEC_LP64  
648.exchange2_s: -DSPEC_LP64  
657.xz_s: -DSPEC_LP64

**Base Optimization Flags**

C benchmarks:
-flags -W1,-mllvm -W1,-function-specialize  
-W1,-mllvm -W1,-region-vectorize -W1,-mllvm -W1,-vector-library=LIBMVEC  
-W1,-mllvm -W1,-reduce-array-computations=3 -O3 -ffast-math  
-march=znver2 -fstruct-layout=3 -mllvm -unroll-threshold=50  
-freemap-arrays -mllvm -function-specialize -mllvm -enable-gvn-hoist  
-mllvm -reduce-array-computations=3 -mllvm -global-vectorize-slp  
-mllvm -vector-library=LIBMVEC -mllvm -inline-threshold=1000  
-ffunction-specialization -z muldefs -DSPEC_OPENMP -fopenmp  
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm  
-ljemalloc -lflang

C++ benchmarks:
-flags -W1,-mllvm -W1,-function-specialize  
-W1,-mllvm -W1,-region-vectorize -W1,-mllvm -W1,-vector-library=LIBMVEC  
-W1,-mllvm -W1,-reduce-array-computations=3  
-W1,-mllvm -W1,-suppress-fmas -O3 -ffast-math -march=znver2  
-mllvm -loop-unswitch-threshold=200000 -mllvm -vector-library=LIBMVEC  
-mllvm -unroll-threshold=100 -ffunction-specialization  
-mllvm -enable-partial-unswitch -z muldefs -DSPEC_OPENMP -fopenmp  
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm  
-ljemalloc -lflang

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Test Date: Feb-2020
Hardware Availability: Dec-2019
Software Availability: Aug-2019

Base Optimization Flags (Continued)

Fortran benchmarks:
-`-flto` `-W1,-mlllvm -W1,-function-specialize`
-`-W1,-mlllvm -W1,-region-vectorize -W1,-mlllvm -W1,-vector-library=LIBMVEC`
-`-W1,-mlllvm -W1,-reduce-array-computations=3 `-ffast-math`
-`-W1,-mlllvm -W1,-inline-recursion=4 `-W1,-mlllvm -W1,-lslr-in-nested-loop`
-`-W1,-mlllvm -W1,-enable-iv-split -O3 `-march=znver2 `-funroll-loops`
-`-mrecursive `-mlllvm `-vector-library=LIBMVEC `-z muldefs`
-`-mlllvm `-disable-indvar-simplify `-mlllvm `-unroll-aggressive`
-`-mlllvm `-unroll-threshold=150 `-DSPEC_OPENMP `-fopenmp `-DUSE_OPENMP`
-`-fopenmp=libomp `-lomp `-lpthread `-ldl `-lmvec `-lamdlibm `-ljemalloc`
-`-lflang`

Base Other Flags

C benchmarks:
`-Wno-return-type`

C++ benchmarks:
`-Wno-return-type`

Fortran benchmarks:
`-Wno-return-type`

Peak Compiler Invocation

C benchmarks:
`clang`

C++ benchmarks:
`clang++`

Fortran benchmarks:
`flang`

Peak Portability Flags

600.perlbench_s: `-DSPEC_LINUX_X64 `-DSPEC_LP64
602.gcc_s: `-DSPEC_LP64
605.mcf_s: `-DSPEC_LP64

(Continued on next page)
Peak Portability Flags (Continued)

620.omnetpp_s: -DSPEC_LP64
623.xalancbk_s: -DSPEC_LINUX -D_FILE_OFFSET_BITS=64
625.x264_s: -DSPEC_LP64
631.deepsjeng_s: -DSPEC_LP64
641.leela_s: -DSPEC_LP64
648.exchange2_s: -DSPEC_LP64
657.xz_s: -DSPEC_LP64

Peak Optimization Flags

C benchmarks:

600.perlbench_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3
-fprofile-instr-generate(pass 1)
-fprofile-instr-use(pass 2) -Ofast -march=znver2
-mn-o-sse4a -mstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -lmvec -ldl -ljemalloc -fopenmp=libomp -lomp
-lpthread -ldl -ljemalloc -flang

602.gcc_s: -flto -Wl,-mllvm -Wl,-function-specialize
-Wl,-mllvm -Wl,-region-vectorize
-Wl,-mllvm -Wl,-vector-library=LIBMVEC
-Wl,-mllvm -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -mstruct-layout=5
-mllvm -vectorize-memory-aggressively
-mllvm -function-specialize -mllvm -enable-gvn-hoist
-mllvm -unroll-threshold=50 -fremap-arrays
-mllvm -vector-library=LIBMVEC
-mllvm -reduce-array-computations=3
-mllvm -global-vectorize-slp -mllvm -inline-threshold=1000
-flv-function-specialization -z muldefs -DSPEC_OPENMP
-fopenmp -DUSE_OPENMP -fpic -fgnu89-inline -fopenmp=libomp
-lomp -lpthread -ldl -ljemalloc

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Tested by: HPE

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Hardware Availability: Dec-2019
Software Availability: Aug-2019

Peak Optimization Flags (Continued)

605.mcf_s: -flto -Wl,-mllvm -Wl,-function-specialize
-mllym -Wl,-region-vectorize
-mllym -Wl,-vector-library=LIBMVEC
-mllym -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -mno-sse4a -flstruct-layout=5
-mllym -vectorize-memory-aggressively
-mllym -function-specialize -mllym -enable-gvn-hoist
-mllym -unroll-threshold=50 -fremap-arrays
-mllym -vector-library=LIBMVEC
-mllym -reduce-array-computations=3
-mllym -global-vectorize-slp -mllym -inline-threshold=1000
-fly-function-specialization -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -lmvec -ldl -ljemalloc -fopenmp=libomp -lomp
-ldl -ljemalloc -lflang

625.x264_s: Same as 600.perlbench_s

657.xz_s: basepeak = yes

C++ benchmarks:

620.omnetpp_s: -flto -Wl,-mllvm -Wl,-function-specialize
-mllym -Wl,-region-vectorize
-mllym -Wl,-vector-library=LIBMVEC
-mllym -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -fly-function-specialization
-mllym -unroll-threshold=100
-mllym -enable-partial-unswitch
-mllym -loop-unswitch-threshold=200000
-mllym -vector-library=LIBMVEC
-mllym -inline-threshold=1000 -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl
-lmvec -ldl -ljemalloc -lflang

623.xalancbmk_s: -m32 -flto -Wl,-mllvm -Wl,-function-specialize
-mllym -Wl,-region-vectorize
-mllym -Wl,-vector-library=LIBMVEC
-mllym -Wl,-reduce-array-computations=3 -Ofast
-march=znver2 -fly-function-specialization
-mllym -unroll-threshold=100
-mllym -enable-partial-unswitch
-mllym -loop-unswitch-threshold=200000
-mllym -vector-library=LIBMVEC
-mllym -inline-threshold=1000 -DSPEC_OPENMP -fopenmp
-DUSE_OPENMP -fopenmp=libomp -lomp -lpthread -ldl
-ljemalloc

(Continued on next page)
### Peak Optimization Flags (Continued)

631.deepsjeng_s: Same as 620.omnetpp_s

641.leela_s: basepeak = yes

Fortran benchmarks:

- `fltto` `-Wl,-mlvm -Wl,-function-specialize`
- `Wl,-mlvm -Wl,-region-vectorize -Wl,-mlvm -Wl,-vector-library=LIBMVEC`
- `Wl,-mlvm -Wl,-reduce-array-computations=3 -ffast-math`
- `Wl,-mlvm -Wl,-inline-recursion=4 -Wl,-mlvm -Wl,-lsr-in-nested-loop`
- `Wl,-mlvm -Wl,-enable-iv-split -O3 -march=znver2 -funroll-loops`
- `-Mrecursive -mlvm -vector-library=LIBMVEC`
- `-mlvm -disable-indvar-simplify -mlvm -unroll-aggressive`
- `-mlvm -unroll-threshold=150 -DSPEC_OPENMP -fopenmp -DUSE_OPENMP`
- `-fopenmp=libomp -lomp -lpthread -ldl -lmvec -lamdlibm -ljemalloc`
- `-lflang`

### Peak Other Flags

C benchmarks:

- `-Wno-return-type`

C++ benchmarks (except as noted below):

- `-Wno-return-type`

623.xalancbmk_s: `-Wno-return-type`

- `-L/sppo/dev/cpu2017/v110/amd_speed_aocc200_rome_C_lib/32`

Fortran benchmarks:

- `-Wno-return-type`

The flags files that were used to format this result can be browsed at

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revH.html


You can also download the XML flags sources by saving the following links:

http://www.spec.org/cpu2017/flags/HPE-Platform-Flags-AMD-V1.2-EPYC-revH.xml

http://www.spec.org/cpu2017/flags/aocc200-flags-C1-HPE.xml
# SPEC CPU®2017 Integer Speed Result

**Hewlett Packard Enterprise**  
(Test Sponsor: HPE)  
ProLiant DL325 Gen10 Plus  
(2.35 GHz, AMD EPYC 7452)  

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Tested with SPEC CPU®2017 v1.1.0 on 2019-02-14 09:23:44-0500.  